第１９講　環境論

今日のポイント

次の英文を読んで，設問に答えよ。

If climate change and population growth progress at their current pace, in roughly fifty years farming (1)as we know it will no longer exist. This means that the majority of people could soon be without enough food or water. But there is a solution that is surprisingly within reach, and that is to move most farming into cities, and grow crops in tall, specially constructed buildings. It is called vertical farming.

The floods and lack of rainfall that have come with climate change are destroying traditional farmland. Three recent floods, for example, have cost the United States billions of dollars in lost crops, with even more serious losses in *topsoil. In India changes in rain patterns and temperature could reduce its agricultural output by 30 percent or more by the end of the century.

(2)What is more, population increases will soon reduce the amount of land available to American farmers. The amount of land for farming per person has decreased from about an acre in 1970 to roughly half an acre in 2010, and it is expected to decline to about a third of an acre by 2050. With billions more people on the way, before we know it the traditional soil-based farming model developed over the last 12,000 years will no longer be possible

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anywhere. In short, it has become alarmingly clear that the world must find new methods of food production and distribution.

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Now imagine a vertical farm built within the limits of a major city. Food production would take advantage of *hydroponic methods that use far less water than conventional cultivation techniques, in some cases as much as 90 percent less. When we apply the vertical farm concept to countries that are *water-challenged, such as those in the Middle East, the benefits of vertical farming look even more attractive. For this reason the world's very first vertical farm may well be established there, although the idea has now attracted considerable interest from architects, scientists and governments all over the world.

The list of benefits of the vertical farm is indeed long. To start with, crop production would no longer be limited by seasons or be impacted by poor weather. The farm itself would behave like a functional ecosystem in which waste is recycled to be used over and over again. By supplying a continuous quantity of fresh vegetables and fruits to city residents, such farms would help prevent health problems, some of which (3)arise from the lack of quality food in our diet. They would not only improve urban life, but also help to restore the land that was damaged by traditional farming. For every indoor acre farmed, some ten to twenty outdoor acres of farmland could be allowed to return to their original state. The vertical farm would also create new employment opportunities for the expanding populations of urban centers, centers in which (4)abandoned properties could become productive once again.

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Moreover, vertical farms would produce crops that contain no added chemicals. The farms would greatly reduce air pollution, since they would eliminate the need for heavy farm machines and trucks that deliver food from farm to fork. Think how great it would be if everything on your plate came from around the corner, rather than from hundreds or thousands of miles away. The (5)structures themselves would be things of beauty and grace. In order to allow plants to capture sunlight, walls and ceilings would be completely transparent. So from a distance, it would look as if they were gardens (6)suspended in space.

While experimental vertical farming projects in the United States and the United Kingdom have shown very positive results thus far, it is important to (7)bear in mind that the science of vertical farming still has a long way to go. To be successful in the long term, vertical farming will still need to prove that it is economically efficient, especially with respect to energy and urban land costs. Its supporters firmly believe not only that science and economics are on their side, but that the world's growing food crisis requires of us a brilliant and therefore daring response.

[A Farm on Every Floor by Dickson Despommier, The New York Times, August 23, 2009 © The New York Times]

（注）

*topsoil　表土　　*hydroponic　水栽培の　　*water-challenged　水に困っている

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問 1　本文の内容を考え，下線部 (1) ～ (7) の意味に最も近いものを a ～ d から 1 つずつ選び，その記号を書きなさい。

(1) as we know it

a. in the country
b. for most people
c. in the traditional sense
d. for its cultural value

(2) What is more

a. In addition
b. In contrast
c. Mistakenly
d. Formerly

(3) arise from

a. are followed by
b. are caused by
c. are confirmed by
d. are broken by

(4) abandoned

a. no longer growing
b. improperly managed
c. completely polluted
d. currently unused

(5) structures

a. corners
b. vehicles
c. machines
d. buildings

(6) suspended in space

a. seen on the far horizon
b. hanging above the ground
c. nearly level with the earth below
d. balanced in form and function

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(7) bear in mind

a. admit　　b. keep insisting　　c. understand　　d. continue doubting

問 2　本文の内容を考え，次の 1 ～ 6 に続けると本文に最も即した内容になるものを a ～ d から 1 つずつ選び，その記号を書きなさい。

1. Vertical farms offer the world an answer to the

a. problems created by climate change.

b. questions that cannot be explained by science.

c. scientists who doubt the existence of a world crisis.

d. climate proposals made by researchers everywhere.

2. The United States and India are mentioned here because they

a. have begun to build vertical farms.

b. fail to recognize the problems they have created.

c. understand their need to build vertical farms.

d. have to face serious agricultural problems.

3. The land for farming per person in the United States

a. has to be doubled in order for Americans to survive.

b. has to be used for vertical farms to avoid a food crisis.

c. will be nearing the zero point within three decades.

d. will continue to decrease rapidly because of overpopulation.

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4. The fact remains that the current food crisis affects and will affect

a. poorer farmers more critically than wealthy ones.

b. the United States less severely than other countries.

c. agricultural producers throughout the entire world.

d. non-American farmers more seriously than American ones.

5. Food production systems based on vertical farming

a. will require less water than traditional ones do.

b. will need to stop during the winter months.

c. cannot operate in water-challenged regions of the world.

d. cannot rely on technologies developed within the United States.

6. The crops grown in vertical farms have the advantage of

a. combining wetness and dryness in equal proportion.

b. ensuring an improved and more stable food supply.

c. offering better or equal quality at a greater price.

d. requiring fewer workers as well as fewer city employers.

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問 3　本文の内容を考え，次の 1 ～ 2 の正しい答えになるものを a ～ d から 1 つずつ選び，その記号を書きなさい。

1. What question about vertical farming remains to be answered?

a. Whether it would pollute the air.

b. Whether many trucks would be needed.

c. Whether a daring response would be risky.

d. Whether this system would save money.

2. Which of the following titles best expresses the content of the passage?

a. Why the traditional farm will not be replaced by the vertical farm

b. The history of food production technology up to the present day

c. The promise of vertical farms in a food-challenged world

d. Growing fresher vegetables with traditional farming method

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高３ハイレベル英語～読解編～　後期　復習テスト　第十九回

次の見出し語や下線部の意味に合う選択肢を選びなさい。

1. current

① 理想の　② 現在の　③ 明らかな　④ 実在の

2. vertical

① 硬直した　② 垂直の　③ 様々な　④ 水平の

3. decline

① 宣言する　② 増加する　③ 減少する　④ 引退する

4. distribution

① 貢献　② 展示　③ 分配　④ 処分

5. quantity

① 質　② 芯　③ 円　④ 量

6. 不動産

① property　② properly　③ penalty　④ prevail

7. 捨てる

① reduce　② abandon　③ avoid　④ abundant

8. 優美

① grace　② grind　③ race　④ place

9. 透明な

① transport　② transform　③ transparent　④ transfer

10. 停止する

① suspend　② suspect　③ supply　④ support

11. <u>In fifty years farming as we know it will no longer exist</u>.

① 五十年の農業で，我々はそれがもはや存在しないと分かっている。

② 五十年後には，我々は農業はもはや存在しないと分かっている。

③ 五十年後の農業で，我々が知っているものはもはや存在しないだろう。

④ 五十年後には，我々が知っているような農業はもはや存在していないだろう。

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高３　ハイレベル英語～読解編～　第 19 講　解答

＜解答＞

問１　(1) c　(2) a　(3) b　(4) d
　　　(5) d　(6) b　(7) c

問２

１　a　2　d　3　d　4　c　5　a
6　b

問３

1　d　2　c

＜全訳＞

気候変動と人口増加が現在のペースで進むなら，およそ 50 年後に，今日知られているような農業はもはや存在しなくなるだろう。このことは，大多数の人間は，やがて十分な食料や水が得られなくなる可能性があることを意味する。しかし，驚くほど近くに解決策がある。それは農業の大半を都市に移し，専用に建造した背の高い建物で作物を栽培するのである。それは垂直農業と呼ばれている。

気候変動と共にやって来た洪水や雨不足は，昔からある農地を破壊しつつある。例えば，最近の 3 回の洪水で，アメリカは数十億ドル相当の作物を失い，さらにずっと深刻な表土流失の損失があった。インドでは降雨パターンと気温の変化により，今世紀末までに農業生産高が 30% かそれ以上減少するかもしれない。

さらに，人口増加によって，アメリカの農家が利用できる農地の量はすぐに減少していく。1 人あたりの農地面積は，1970 年の約 1 エーカーから 2010 年にはおよそ半エーカーに減り，2050 年までに約 3 分の 1 エーカーまで減少すると予想されている。途中で人口が何十億も増えれば，あっという間に過去 1 万 2,000 年間に開発されてきた，土壌を基にした伝統農法は，もはやどこでもできなくなる。要するに，世界が食糧の生産と流通の新たな方法を見つけなければならないことは，不安にさせるほど決定的になっている。

大都市の境界内に作られた垂直農場を想像してみよう。食糧生産は使用する水が従来の栽培法よりはるかに少ない水栽培を利用するが，場合によっては，90% も使用する水が少ないケースもある。中東諸国など，水不足の国々に垂直農場の構想を適用すれば，垂直農業の利点がいっそう魅力的に見える。このため世界初の垂直農場はおそらくそこに設立されるだろうが，もっとも今そのアイデアは，世界中の建築家，科学者，政府からかなりの関心を集めている。

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垂直農場の利点を挙げると，実に長くなる。まず，作物生産はもう季節に制限されたり，天候不良に影響されたりしない。農場自体が機能的な生態系の様な働きをし，そこでは廃棄物はくりかえし使うためにリサイクルされる。都市住民に多量の新鮮な野菜と果物を継続的に供給することによって，そのような農場は健康問題の予防に役立つだろう。その問題のいくつかは，毎日の食事で質の高い食物が不足していることが原因だ。その農場は都市生活を改善するだけでなく，伝統農業によって痛めつけられた土地の回復にも役立つ。屋内で１エーカーを耕作するごとに，およそ 10 ～ 20 エーカーの屋外農地を元の状態に戻すことができる可能性がある。垂直農場は都市の中央部で増え続ける住民に，新たな雇用機会を作り出すことにもなる。都心で捨てられた不動産が再び生産的になりうる。

さらに垂直農場は，化学添加物を含まない作物を作ることになるだろう。その農場によって，大気汚染は大幅に減るだろう。その理由は大型重機や農場から食卓まで食物を届けるトラックが必要なくなるからだ。自分の皿に載る物がすべて何百あるいは何千マイルも離れたところからではなく，すぐ近くから来ているなら，どれほど素晴らしいか考えてみるといい。建造物自体も美しく優雅なものになるだろう。植物が日光を浴びられるように壁や天井は完全に透明になる。だから遠くから見ると，まるで空中にぶら下がる庭園のように見えるだろう。

アメリカやイギリスの垂直農業の実験プロジェクトは今までのところ，極めてよい結果を上げてきたが，垂直豊業の科学は，まだ長い道のりがあることを心に留めておくことが重要だ。長期的に成功するには，垂直農業は，特にエネルギーと都市の土地代に関して経済効率がよいことを証明する必要がある。支持者たちは，科学および経済が自分たちに味方するだけでなく，世界で拡大する食糧危機が我々に見事で，それゆえに大胆な対応を要求しているのだと確信している。

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第19講　重要語彙リスト

1	current	現在の	24	supply	供給する
2	roughly	およそ	25	quantity	量
3	no longer	もはや～ない	26	resident	居住者
4	majority	大多数	27	arise from	~が原因だ
5	solution	解決策	28	urban	都市の
6	reach	届く範囲	29	restore	回復する
7	vertical	垂直の	30	opportunity	機会
8	flood	洪水	31	abandon	捨てる
9	cost O_1 O_2	O_1 に O_2 がかかる	32	property	不動産
10	output	収穫高	33	crop	作物
11	what is more	さらに	34	eliminate	削除する
12	available	利用できる	35	around the corner	すぐそばで
13	decrease	減らす	36	structure	構造
14	decline	減少する	37	grace	優美
15	on the way	その途中で	38	capture	捕える
16	alarmingly	不安にさせるほど	39	ceiling	天井
17	distribution	分配	40	transparent	透明な
18	take advantage of	利用する	41	suspend	停止する・ぶら下げる
19	conventional	慣習的な	42	bear in mind	心に留める
20	cultivation	耕作	43	with respect to	~に関して
21	considerable	かなりの	44	on one’s side	～の味方に
22	architect	建築家	45	require A of B	BからAを要求する
23	ecosystem	生態系	46	daring	勇気ある

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第 19 講　音読用白文　①　②　③　④　⑤　⑥　⑦　⑧　⑨　⑩

If climate change and population growth progress at their current pace, in roughly fifty years farming as we know it will no longer exist. This means that the majority of people could soon be without enough food or water. But there is a solution that is surprisingly within reach, and that is to move most farming into cities, and grow crops in tall, specially constructed buildings. It is called vertical farming.

The floods and lack of rainfall that have come with climate change are destroying traditional farmland. Three recent floods, for example, have cost the United States billions of dollars in lost crops, with even more serious losses in topsoil. In India changes in rain patterns and temperature could reduce its agricultural output by 30 percent or more by the end of the century.

What is more, population increases will soon reduce the amount of land available to American farmers. The amount of land for farming per person has decreased from about an acre in 1970 to roughly half an acre in 2010, and it is expected to decline to about a third of an acre by 2050. With billions more people on the way, before we know it the traditional soil-based farming model developed over the last 12,000 years will no longer be possible anywhere. In short, it has become alarmingly clear that the world must find new methods of food production and distribution.

Now imagine a vertical farm built within the limits of a major city. Food production would take advantage of hydroponic methods that use far less water than conventional cultivation techniques, in some cases as much as 90 percent less. When we apply the vertical farm concept to countries that are water-challenged, such as those in the Middle East, the benefits of vertical farming look even more attractive. For this reason the world’s very first vertical farm may well be established there, although the idea has now attracted considerable interest from architects, scientists and governments all over the world.

The list of benefits of the vertical farm is indeed long. To start with, crop production would no longer be limited by seasons or be impacted by poor

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weather. The farm itself would behave like a functional ecosystem in which waste is recycled to be used over and over again. By supplying a continuous quantity of fresh vegetables and fruits to city residents, such farms would help prevent health problems, some of which arise from the lack of quality food in our diet. They would not only improve urban life, but also help to restore the land that was damaged by traditional farming. For every indoor acre farmed, some ten to twenty outdoor acres of farmland could be allowed to return to their original state. The vertical farm would also create new employment opportunities for the expanding populations of urban centers, centers in which abandoned properties could become productive once again.

Moreover, vertical farms would produce crops that contain no added chemicals. The farms would greatly reduce air pollution, since they would eliminate the need for heavy farm machines and trucks that deliver food from farm to fork. Think how great it would be if everything on your plate came from around the corner, rather than from hundreds or thousands of miles away. The structures themselves would be things of beauty and grace. In order to allow plants to capture sunlight, walls and ceilings would be completely transparent. So from a distance, it would look as if they were gardens suspended in space.

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復習テスト　解答

< 第十九回 >

1. ②	2. ②	3. ③	4. ③
5. ④	6. ①	7. ②	8. ①
9. ③	10. ①	11. ④	

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